

157149

CORPORATE

ENGINEERING

DESIGN

# BUDGET ESTIMATE

CEA NO. 3808	DATE August 20, 1984
PROJECT TITLE Main South Trunk Sewer	
COMPANY MIC	LOCATION W.G.K.
PROBABLE ACCURACY +10 to -10	

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		R. L. Wiese	- CS6G

Attached is Budget Estimate Number 3808-03.0.

	AR ESTIMATE	BUDGET ESTIMATE
Capital	\$5,000,000	\$5,000,000
Expense	700,000	1,200,000
Total	\$5,700,000	\$6,200,000

The committed plus expended was 11% when this budget estimate was made; with the GMP committed this percent would be 86% C&E..

  
Cost Engineer

WGK 4084881

APPROVED BY:   
Cost/Sch. Superintendent

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CE 149. 177

Monsanto

# Monsanto

CORPORATE ENGINEERING DEPARTMENT  
COST ENGINEERING SECTION

CEA NUMBER	3808
CE ESTIMATE NUMBER	3808-03.0
DATE	August 20, 1984
COST ENGINEER	R. C. Ferrario

## ESTIMATE COMMENTS AND QUALIFICATIONS

PROJECT TITLE Main South Trunk Sewer  
LOCATION W.G.K. COMPANY MIC

### PROJECT DESCRIPTION AND CLASSIFICATION

This project will provide a new 42 inch diameter trunk sewer to carry all the plant sewer load now carried by the two Sauget Village sewers.

The new sewer will combine most plant sewer loads into one discharge point where sampling and measuring devices will be provided. The exceptions are sulfuric acid manufacturing, the laboratory, and Lot A which discharge into the village sewer on the north side of the plant. The existing south plant sewer system has about nineteen discharge points into the village sewer.

This project has been classified as a Utilities project (UTS).

### ESTIMATE INFORMATION SOURCE

*now classified as an environmental project  
NO SALES TAX ON EQUIP.*

The basis for this Budget Estimate is the Guaranteed Maximum Price (GMP) award for the sewer work, plus, anticipated growth. The project cost report dated 7/20/84 was used to confirm commitments and expenditures thru that date. The estimate to complete was developed thru inputs from key project participants.

### KEY ASSUMPTIONS

This project will be constructed on a guaranteed maximum price basis using union shop construction labor.

Plant personnel will operate and maintain the dewatering pumps and wells.

#01952

WCK 4084882

### ESTIMATE ANALYSIS

The Capital portion of this project has remained the same as A.R. Estimate, \$5000k. The estimated expense cost has increased \$500k for the following reasons. The first is the care of flow, diversion sewer, for an estimated cost of \$338k. The second is the T<sub>1</sub> thru T<sub>3</sub> jumpers required, at an estimated cost of \$65k. The last expense item is the removal and repair of existing plant assets, namely curbs, pavement, R.R. tracks that were originally estimated in the capital portion of the lump sum cost. The estimated cost for removal and repair of these assets is \$82k. The project strategy was changed from lump sum to guaranteed maximum price (GMP). The following table will highlight where the major costs have increased or moved due to project execution strategy.

<u>Items</u>	<u>AR Estimate</u>	<u>Budget Estimate</u>
Total Directs	\$3,896k	\$2,550k
Construction Indirects	457	2,145
Engineering	486	650
D-T-E	(253)	(568)
Contingency	<u>414</u>	<u>223</u>
Total Capital	\$5,000k	\$5,000k
Total Expense	\$700k	\$1,200k

### RISK ANALYSIS

A Project Risk Analysis meeting was held on August 17, 1984. As a result of this meeting the capital remained at \$5000k and expense at \$1200k.

### ESTIMATE ACCURACY

This estimate is believed to be accurate to within plus 10 percent to minus 10 percent.

The major area of future cost uncertainty lies in the amount of contaminated soil that may be encountered during soil excavation. Only nominal allowances have been included in this estimate to cover contaminated soil handling problems. It was judged to be inappropriate to add any significant funds to this estimate to cover contaminated soil problems because whatever was added would be based simply on a guess of what may be encountered.

WGX 4084883

### CAPITAL DIRECTS

All Capital Directs were developed using the Project Cost Report dated 7/20/84 to establish the C&E. The ETC was developed from the GMP package and the awarded lump sum package for dewatering. The following is a breakdown of the GMP:

o Contract with Alberici (6/15/84)	\$4,192k
o Less - Adjustments to contract	<u>(450)</u>
o Capital cost for major sewer work	\$3,742k
o Assume a 5% savings (because of shared savings incentive)	<u>x.95</u>
Subtotal Capital	\$3,555k
o Estimated growth of 15%	<u>530</u>
Total Capital - GMP	\$4,085k

### CONSTRUCTION INDIRECTS

The construction indirects were estimated by CED construction (R. J. Murphy) using zero-base budgeting. Additional cost is included for the T&M labor (capital & expense) that is part of the guaranteed maximum price (GMP). The indirects associated with the labor for this GMP was estimated by cost engineering using historical data from CEA 3189 - JFQ Spill Control Project. The estimate has been reviewed and accepted by cost engineering and CED construction.

### UNDEVELOPED DESIGN

No allowance is included in this estimate for undeveloped design.

### CONTINGENCY - CAPITAL

A capital contingency of 4% of total capital has been included in this estimate. This amount was arrived at by using 3% of the committed and 5% of the estimate to complete.

WCK 4084884

ENGINEERING

The engineering estimate was prepared by the cost engineer using an updated PHED report provided by the project manager. It is estimated that at project completion, a total of 13,500 manhours of Code 1 Engineering will have been expended to design and construct this facility.

ENGINEERING ANALYSIS

	<u>AR Estimate</u>	<u>Budget Estimate</u>
Capital	\$ 5,000,000	\$ 5,000,000
Eng. MHS Estimated	10,247	13,500
Eng. Cost Estimated		
CED - Inhouse	466,000	600,000
Outside Eng.	<u>20,000</u>	<u>50,000</u>
Total Eng.	\$486,000	\$650,000
Eng. % of Total Capital	8%	10%

COMPARISON BY RESOURCE CENTER

<u>Resource Center</u>	<u>MANHOURS</u>	
	<u>AR Estimate</u>	<u>Budget Estimate</u>
30 - MIC SPEO	5,050	6,500
31 - MIC Engineering	176	800
42 - ACM Engr.	-	300
47 - Mech Tech & Engr.	80	80
44/45 - PCE Design	-	250
49 - Construction	3,875	4,500
61 - Environment Engr.	-	50
63 - St. L Proc. Mgmt.	100	50
71 - Accounting	800	800
74 - Procurement	166	150
- Others	<u>-</u>	<u>20</u>
	10,247	13,500

The increased manhours are due primarily to changes in the routing and straightening of the main sewer, increased duration of construction activities, and evaluation of the lump sum/GMP packages and alternatives proposed by Alberici.

WGK 4084885

COST ESCALATION ALLOWANCE

All major items have been purchased by CED and no large material items remain to be purchased other than those items in the GMP. The guaranteed maximum price for the sewer work has been agreed to and engineering design is complete. All escalation is included in the GMP and no forward escalation is necessary for capital direct cost.

PROJECT EXPENSE

Project expense cost was estimated based on the description of work to be completed and items identified by accounting that were part of the lump sum capital cost in the AR estimate. Other expense cost are included from the GMP contract. A factor of 105% of expense direct labor and materials was used for distributives transferred to expense for all time and material (T&M) work.

CONTINGENCY - EXPENSE

An allowance of 8% of total expense is included in this estimate for expense contingency.

Estimate Review Held

8/22/84

Reviewed by:

R. J. Meile

#01952

WCK 4084886

HUSAR TO COMPANY  
CORPORATE ENGINEERING DEPARTMENT  
COST ENGINEERING SECTION

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PROJECT SUMMARY

CE# NUMBER 3808  
SCOPE DATE 03/28/83  
CE ESTIMATE NUMBER 3808-03.0 (U)  
ESTIMATE DATE 08/20/84  
COST ENGINEER R.C. FERREARIO  
AREA/SECTION MANAGER F.A. MAYSE  
PROJECT MANAGER G.A. GRUNDMANN  
ESTIMATE TYPE BUDGET

PROJECT TITLE.....MAIN SOUTH TRUNK SEWER  
LOCATION.....W G KRUMHRIK PLANT

COMPANY.....MIC

DESCRIPTION	EQUIPMENT	LABOR	MATERIAL	LUMP SUM	DISTRIBUTIVE	TOTAL COST
INSTALLED M & F	20,000	1,410,000	980,000	140,000		2,550,000
SPARE S						
LAND						
BUILDINGS						
CONSTRUCTION INDIRECTS					2,145,000	2,145,000
ENGINEERING - 15 PCT TOT CAP*					650,000	650,000
DISTRIBUTIVES TC EXPENSE					-568,000	-568,000
CONTINGENCY - 04 PCT TOT CAP*					223,000	223,000
OTHER						
UNDEVELOPED DESIGN						
TOTAL CAPITAL	20,000	1,410,000	980,000	140,000	2,450,000	5,000,000

DISPENSING		155,000	15,000		180,000	350,000
SALES & USE TAXES					1,000	1,000
RELATES		100,000	2,000		108,000	210,000
TELOCATIONS & MODIFICATIONS		105,000	52,000		249,000	486,000
START-UP MODIFICATIONS		23,000	6,000		31,000	60,000
CONTINGENCY - 05 PCT TOT EXP					93,000	93,000
TOTAL EXPENSE		463,000	75,000		662,000	1,200,000
TOTAL PROJECT	20,000	1,873,000	1,055,000	140,000	3,112,000	6,200,000

APPROVAL - COST ENGR. SUPERVISOR...

DATE... 8/22/84

PROJECT MANAGER.....

DATE... 8/22/84

\* PERCENT CALCULATION BASED UPON TOTAL CAPITAL MINUS UNDEVELOPED DESIGN

WCK 4084887

BOSSARD COMPANY  
CORPORATE ENGINEERING  
COST ENGINEERING SECTION

CE ESTIMATE NUMBER..... 3808-03.0 (U)  
DATE..... 08/20/84  
COST ENGINEER..... R.C.FERRARIO

## PROJECT CATEGORY SUMMARY

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PROJECT TITLE..... MAIN SOUTH TRUNK SEWER

LOCATION..... W G KRUMMRICH PLANT

COMPANY..... MIC

CAT DESCRIPTION	PCT 01	EQUIPMENT	LABOR	MATERIAL	LUMP SUM	TOTAL COST
01 EQUIPMENT ITEMS	100.0	20,000				20,000
02 INSTRUMENT ITEMS	50.0			10,000		10,000
03 SAT EQUIPMENT	7.5		1,000	500		1,500
04 SAT INSTRUMENTS	52.5		8,000	2,500		10,500
11 PIPING	25.0		1,000	4,000		5,000
13 ELECTRICAL	340.0		30,000	38,000		68,000
15 SEWERS DRAINS & PLUG	12175.0		1,370,000	925,000	140,000	2,435,000
TOTAL CAPITAL DIRECT	12750.0	20,000	1,410,000	980,000	140,000	2,550,000

CAT DESCRIPTION	DISTRIBUTIVE	EQUIPMENT	LABOR	MATERIAL	LUMP SUM	TOTAL COST
50 MISCELLANEOUS	180,000		155,000	15,000		350,000
51 START-UP EXP - TAX	1,000					1,000
52 REPAIR EXPENSE	108,000		100,000	2,000		210,000
53 RELOC & MOD - EXP	249,000		185,000	52,000		486,000
54 START-UP RELOC & MOD	31,000		23,000	6,000		60,000
55 CONTINGENCIES - EXP	93,000					93,000

TOTAL EXPENSE	662,000		463,000	75,000		1,200,000
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TOTAL EACH AREA 50	662,000	20,000	1,873,000	1,055,000	140,000	3,750,000
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MCK 4084888



PROJECT COMPANY  
 CORPORATE ENGINEERING  
 COST ENGINEERING SECTION  
 CE ESTIMATE NUMBER..... 3808-03.0 (U)  
 DATE..... 06/20/84  
 COST ENGINEER..... R.C. FERRARIO

ATTACHMENT A - SUMMARY

PROJECT..... MAIN SOUTH TRUNK SEWER  
 LOCATION..... W G KUMMICH PLANT  
 AREA NUMBER..... AREA 111..... MAIN SOUTH TRUNK SEWER COMPANY..... MIC

CAT DESCRIPTION	PCT 01	EQUIPMENT	LABOR	MATERIAL	LUMP SUM	TOTAL COST
01 EQUIPMENT ITEMS	100.0	20,000				20,000
02 EQUIPMENT ITEMS	50.0			10,000		10,000
03 SET EQUIPMENT	7.5		1,000	500		1,500
04 SET EQUIPMENT	52.5		6,000	2,500		10,500
11 PIPING	25.0		1,000	4,000		5,000
13 ELECTRICAL	300.0		30,000	38,000		68,000
15 SEWERS DRAINS & PLUMB	12175.0		1,370,000	925,000	140,000	2,435,000
TOTAL CAPITAL DIRECT	12750.0	20,000	1,410,000	980,000	140,000	2,550,000

CAT DESCRIPTION	DISTRIBUTIVE	EQUIPMENT	LABOR	MATERIAL	LUMP SUM	TOTAL COST
20 DISBURSING	100,000		155,000	15,000		350,000
91 START-UP EXP - TAX	1,000					1,000
92 REPAIR EXPENSE	100,000		100,000	2,000		210,000
93 RELOC & MOD - EXP	249,000		185,000	52,000		486,000
94 START-UP RELOC & MOD	31,000		23,000	9,000		63,000
95 CONTINGENTS - EXP	93,000					93,000
TOTAL EXPENSE	662,000		463,000	75,000		1,200,000
TOTAL AREA	662,000	20,000	1,873,000	1,055,000	140,000	3,750,000

WCK 4084889

HOLSAUTO COMPANY  
CORPORATE ENGINEERING DEPARTMENT  
COST ENGINEERING SECTION

CE ESTIMATE NUMBER..... 3808-03.0 (U)  
DATE..... 08/20/84  
COST ENGINEER..... R.C. FERRARIO

D I S T R I B U T I V E S U M M A R Y

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PROJECT TITLE..... MAIN SOUTH TRUNK SEWER

LOCATION..... W G KROMMICH PLANT

COMPANY..... MIC

AREA NUMBER... 50 AREA TITLE..... DISTRIBUTIVES

GAT DESCRIPTION	LABOR	MATERIAL	TOTAL
	DISTRIBUTIVE	DISTRIBUTIVE	DISTRIBUTIVE

50 CONTR ADMINISTRATION	310,000	36,500	346,500
51 DIRECT LABOUR BURDEN	710,000		710,000
53 CONSTR TOOL & SUPPLY		138,500	138,500
55 CONSTR EQUIPMENT		680,000	680,000
58 OVERTIME PREMIUM	115,000		115,000
67 SITE ADMINISTRATION	70,000	65,000	135,000

TOT CONSTR INDIRECTS	1,205,000	940,000	2,145,000
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30 C/D ENGINEERING			600,000
61 OUTSIDE ENGINEERING			50,000

TOTAL ENGINEERING			650,000
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17 UNDEVELOPED DESIGN			
52 CONTINGENCIES - CAP			225,000

TOTAL DISTRIBUTIVES			1,018,000
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01 DISTRIBUTIVES TO EXP			-568,000
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TOT CAP DISTRIBUTIVE			450,000
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MCK 4084890

~~EPA/CERCLA COPPER/LEAD/PCB ATTORNEY WORK PRODUCT / ATTORNEY CLIENT PRIVILEGE~~

## ENGINEERING SUMMARY

R.C.	DISC. NO	DISCIPLINE NAME	MONSANTO MAN-HOURS	DIRECT & INDIRECT COST	REIMBURSABLE COST	PURCHASED ENGINEERING	TOTAL COST
30	30	OPERATING CO. SPCO	6500	238400	2300		240700
31	31	OPERATING CO. ENGINEERING	800	36900	1200		38100
42	40	ACM ENGINEERING	300	14800	400		15200
	41	ACM DRAFTING					
45	21	ELECT & INSTRUMENT DESIGN	250	12400	500		12900
	23	ELECTRICAL UTILITIES					
	26	ANALYZER/COMPUTER DESIGN					
	46	PCE DRAFTING					
47	47	MECH TECH & ENERGY DESIGN	80	3900	300		4200
49	49	CONSTRUCTION	4500	196200	1500		197700
50	50	DOCUMENTS & SYSTEMS					
51	51	DIS/IGS					
61	61	ENVIRONMENTAL ENGINEERING	50	2600	200		2800
	63	TECHNOLOGY					
71	71	ACCOUNTING	800	21700	800		22500
72	72	DATA DEVELOPMENT					
74	74	PROCUREMENT	150	6300			6300
90	90	ENGINEERING SERVICES	-	55900	-		55900
-	-	OTHERS	70	3170	530		3700
CAT 80		CED ENGINEERING	13500	592270	7730		600000
CAT 81		OUTSIDE ENGINEERING				50000	50000
<b>TOTAL ENGINEERING</b>			<b>13500</b>	<b>592270</b>	<b>7730</b>	<b>50000</b>	<b>650000</b>